

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the amendments above and the following remarks. By virtue of the claim amendments, Claims 1, 4, 7, and 10 have been amended and Claim 23 has been added. Therefore, Claims 1-12 and 16-23 are currently pending in the present application, of which, Claims 1, 4, 7, and 10 are independent.

No new matter has been introduced by way of the claim amendments and entry thereof is therefore respectfully requested.

Allowable Subject Matter

The indication that Claim 22 would be allowable if re-written in independent form is noted with appreciation. Because it is believed that Claim 1 is also allowable over the prior art of record, Claim 22 has not been so amended. The Applicants, however, respectively reserve the right to amend Claim 22 in the future.

Response to Arguments

It is respectfully submitted that the comments set forth in the Official Action in reply to the arguments presented in the Response submitted on June 10, 2004 are moot in light of the present Amendment and Remarks.

Claim Rejection Under 35 U.S.C. §102

The test for determining if a reference anticipates a claim, for purposes of a rejection under 35 U.S.C. § 102, is whether the reference discloses all the elements of the claimed

combination, or the mechanical equivalents thereof functioning in substantially the same way to produce substantially the same results. As noted by the Court of Appeals for the Federal Circuit in *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984), in evaluating the sufficiency of an anticipation rejection under 35 U.S.C. § 102, the Court stated:

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

Therefore, if the cited reference does not disclose each and every element of the claimed invention, then the cited reference fails to anticipate the claimed invention and, thus, the claimed invention is distinguishable over the cited reference.

U.S. Patent No. 6,294,821 to Heller (Claims 1 and 2)

Claims 1 and 2 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by the disclosure contained in Heller. The Applicants respectfully traverse this rejection because the claimed invention as set forth in Claim 1, as amended, and the claims that depend therefrom are patentably distinguishable over the disclosure contained in the Heller document.

Claim 1, as amended, pertains to a method for improving performance of liquid-type fuel cells. In the method, a liquid-type fuel cell is provided with a fuel and a platinum-based catalyst, in which the fuel is **methanol**. In addition, a fuel additive is incorporated into the methanol “to reduce CO poisoning to the platinum-based catalyst”.

Heller discloses a fuel cell that uses **hemoglobin** or other biological fluids as the fuel for the fuel cell 100. More particularly, Heller discloses that the fuel cells can be made to

oxidize biochemicals, such as, “sugars, alcohols, carboxylic acids, carbohydrates, starches, and cellulose.” (column 2, lines 45-52). Heller further discloses that the fuel for the fuel cell can be provided by compounds in biological fluids of an animal or plant in which the fuel cell is implanted. (column 3, lines 8-10). In addition, Heller discloses that the compounds may include hemoglobin and that the hemoglobin may be used as in an electroreduction process. (column 3, lines 15-18). Heller, however, **does not** disclose that the fuel for the fuel cell 100 comprises methanol. In fact, Heller teaches away from using methanol as the fuel for fuel cell 100 because Heller is only concerned with using electrolyzing compounds found in biological systems.

Accordingly, Heller does not disclose each and every element claimed in Claim 1 of the present invention and Heller, therefore, cannot anticipate Claim 1 under the provisions of under 35 U.S.C. § 102. The Examiner is therefore respectfully requested to withdraw the rejection of Claim 1 as being anticipated by the disclosure contained in Heller and to provide an indication that Claim 1 is allowable over the prior art of record.

Claim 2 of the present invention is allowable over Heller at least by virtue of its dependency upon allowable Claim 1. Claim 2 also contains features that are not disclosed in the Heller document. For instance, Heller fails to disclose that hemoglobin is incorporated as a fuel additive to a fuel comprised of methanol. The Examiner is thus also respectfully requested to withdraw the rejection of Claim 2.

U.S. Patent Publication No. 2001/0038934 to Berlowitz et al. (Claims 4-6, 16, and 17)

Claims 4-6, 16, and 17 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by the disclosure contained in Berlowitz et al. This rejection is respectfully

traversed because the claimed invention as set forth in Claim 4 and the claims that depend therefrom are patentably distinguishable over the disclosure contained in the Berlowitz et al. document.

Claim 4, as amended, pertains to improving performance of liquid-type fuel cells. In the method, a liquid-type fuel cell having an electrode and **methanol** is provided, in which the **methanol** is the liquid-type fuel, and where the fuel cell also has a liquid-catalyst interface. In addition, a fuel additive is incorporated into the methanol “to increase wettability of the electrode and to decrease interfacial tension of the liquid-catalyst interface.”

In contrast to Claim 4 of the present invention, Berlowitz et al. discloses a reformer for a hydrogen-oxygen fuel cell in which the source of the hydrogen is a fuel and water emulsion. (page 1, paragraph 1). More particularly, Berlowitz et al. discloses that the hydrocarbon fuel is “a low sulfur gasoline, naptha, or other low sulfur, volatile, hydrocarbon fuel”. (page 2, paragraph 15). Berlowitz et al. mentions that methanol or ethanol may be used as an **additive** to the hydrocarbon fuel in applications where freezing may occur. (page 2, paragraphs 16-17). Therefore, Berlowitz et al. does not disclose that the fuel is methanol. Instead, Berlowitz et al. discloses that methanol may be used as an additive in situations where the hydrocarbon fuel may freeze.

Berlowitz et al. also fails to disclose that a fuel additive is incorporated into the methanol to increase wettability of an electrode and to decrease interfacial tension of a liquid-catalyst interface. In one respect, Berlowitz et al. fails to disclose an electrode or a catalyst because Berlowitz et al. pertains to a reformer for fuel and water emulsions and not to a methanol based fuel cell. Therefore, Berlowitz et al. is not concerned with increasing wettability of an electrode. Instead, Berlowitz et al. discloses that a surfactant is used to

prevent the fuel and water emulsion from separating and to therefore maintain the fuel and water emulsion. (page 2, paragraph 18). In fact, there is no disclosure in Berlowitz et al. that the surfactant disclosed therein is capable of increasing wettability of an electrode or that the surfactant is capable of decreasing the interfacial tension of a liquid-catalyst interface.

Accordingly, the Official Action has improperly characterized the Berlowitz et al. document as disclosing each and every element claimed in Claim 4 of the present invention. It is thus respectfully submitted that Berlowitz et al. cannot anticipate Claim 4 and that this claim is allowable over the Berlowitz et al. document. The Examiner is thus respectfully requested to withdraw the rejection of Claim 4 and the claims that depend therefrom.

Claims 5, 6, 16, and 17 depend from allowable Claim 4 and are also allowable over Berlowitz et al. at least by virtue of their dependencies. These claims are allowable over Berlowitz et al. because they contain additional features that are not disclosed in Berlowitz et al. For instance, Berlowitz et al. fails to disclose that a fuel additive incorporated into a methanol fuel to increase wettability of an electrode and to decrease interfacial tension of the liquid-catalyst interface in a liquid-type fuel cell is pre-packed for field use as claimed in Claim 16 of the present invention. The Examiner is thus also respectfully requested to withdraw the rejections of Claims 5, 6, 16, and 17.

U.S. Patent No. 6,331,220 to Wagaman (Claims 4-12, 16, and 18-21)

Claims 4-12, 16, and 18-21 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by the disclosure contained in Wagaman. This rejection is respectfully traversed because the claimed invention as set forth in Claims 4, 7, and 10 and the claims that depend therefrom are patentably distinguishable over the disclosure contained in the

Wagaman document.

Claims 4, 7, and 10 each pertain to methods for improving performance of liquid-type fuel cells. In addition, each of these methods include the step of providing **methanol**, where the **methanol is the liquid-type fuel**.

In contrast to each of Claims 4, 7, and 10, Wagaman discloses gas-generating compositions for use in rocket propulsion systems, torpedoes, safety air bags, etc. (column 1, lines 6-14). Wagaman also broadly states that the gas-generating compositions may be used in oxygen generators and fuel cells. (column 3, lines 50-51). However, Wagaman does not appear to describe the fuel cells with any particularity. That is, Wagaman does not appear to describe any features of the fuel cells and how the gas-generating compositions are used in the fuel cells. For at least this reason, Wagaman cannot be considered as disclosing a liquid-type fuel cell having methanol as the liquid-type fuel as claimed in Claims 4, 7, and 10 of the present invention. In fact, Wagaman does not disclose the use of methanol at all. Clearly, therefore, Wagaman does not disclose each and every element claimed in Claims 4, 7, and 10 of the present invention and thus cannot anticipate these claims.

In addition, Wagaman does not and cannot disclose the step of incorporating into the methanol a fuel additive to increase wettability of an electrode and to decrease interfacial tension of a liquid-catalyst interface as set forth in Claim 4 because Wagaman does not disclose an electrode or a liquid-catalyst interface. Wagaman also does not and cannot disclose the step of incorporating into the methanol a fuel additive to reduce dissolved oxygen in the methanol as claimed in Claim 7. Moreover, Wagaman does not and cannot disclose the step of incorporating into the methanol a fuel additive to remove metal ions that are detrimental to a catalyst or electrolyte as claimed in Claim 10 because Wagaman does not

disclose a liquid-type fuel cell having a catalyst and an electrolyte.

Accordingly, at least by virtue of the failure in the disclosure of Wagaman to include all of the features contained in Claims 4, 7, or 10 of the present invention, Wagaman cannot anticipate Claims 4, 7, or 10 and, thus, the claimed invention as set forth in Claims 4, 7, and 10 is distinguishable over Wagaman. The claims that depend upon allowable Claims 4, 7, and 10 are also allowable at least by virtue of their dependencies.

Claim Rejection Under 35 U.S.C. §103

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in MPEP § 706.02(j):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Therefore, if the above-identified criteria are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

The Official Action sets forth a rejection of Claim 3 under 35 U.S.C. §103(a) as allegedly being unpatentable over the disclosure contained in Heller. This rejection is respectfully traversed because Heller fails to disclose the claimed invention as set forth in Claim 3.

The Official Action correctly notes that Heller fails to disclose that the amount of hemoglobin is in the range of 0.0001-1% by weight as set forth in Claim 3 of the present invention. In an effort to make up for this deficiency, the Official Action asserts that it would have been obvious to one of ordinary skill in the art to employ the hemoglobin in these amounts on the basis that “discovering the optimum or working ranges involves only routine skill in the art.” The Applicants respectfully disagree with this assertion because there is nothing to show that the fuel cell disclosed in Heller would operate under these conditions and therefore there is no motivation to modify Heller in the manner suggested in the Official Action.

In addition, it is respectfully submitted that the proposed modification of Heller would not yield the present invention as set forth in Claim 3 of the present invention. For instance, even assuming for the sake of argument that it would have been obvious to modify Heller to include the features of Claim 3 of the present invention, the proposed modification would still fail to disclose all of the elements as set forth in independent Claim 1.

Accordingly, Claim 3 of the present invention is patentably distinguishable over the disclosure contained in Heller. The Examiner is therefore respectfully requested to withdraw the rejection and to issue an allowance of Claim 3.

Newly Added Claim

Claim 23 has been added to further define the scope of the invention. Claim 23 is allowable over the prior art of record at least by virtue of its dependence on allowable Claim 1.

PATENT

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Conclusion

In light of the foregoing, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should the Examiner believe that a telephone conference with the undersigned would assist in resolving any issues pertaining to the allowability of the above-identified application, please contact the undersigned at the telephone number listed below. Please grant any required extensions of time and charge any fees due in connection with this request to deposit account no. 08-2025.

Respectfully submitted,

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